

REMARKS

Claims 5-6, 8-10 and 15-17 are pending in this application, of which claims 1-4, 7 and 11-14 have been canceled. Claims 9-10 have been withdrawn from consideration and claim 15 has been amended. No new claims have been added.

Claims 3, 5, 6, 8 and 15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Applicants' Admitted Prior Art (hereafter, "APA"), Maeda and Koga (both previously applied). Applicants respectfully traverse this rejection.

In the Preliminary Amendment filed August 21, 2005. Applicants amended claim 15 to recite that the semiconductor chips were each pressed separately at the first fixing and then the semiconductor chips were pressed together in the second fixing.

In the Office Action, the Examiner has stated:

Moreover, as can be reasoned from well established legal precedent, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to repeat the process of the semiconductor chip being pressed separately, such that each chip of the plurality of chips of the combination of Maeda and applicant's admitted prior art being pressed separately, to accomplish an expected additive function or result because applicant has not disclosed that, in view of the applied prior art, the limitation that the semiconductor chips each being pressed separately is for a particular unobvious purpose, produces and unexpected result, or is otherwise critical. Furthermore, it is well established that mere repetition or duplication to accomplish an expected additive function or result is *prima facie* obvious absent a disclosure that the repetition or duplication is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical.

Applicants respectfully disagree. Page 10, lines 22-32 clearly set out the advantage of having each chip pressed separately:

In this fabrication method of the semiconductor device, a tentative-fixing process for alignment and a pressing-and-heating process are individually performed. Therefore, individual apparatuses for the respective processes may be prepared such as the cure/alignment-and-pressing device 25 for precise alignment and the pressing-and-heating device 28 for pressing and heating. Thus, an expensive apparatus which has both an alignment mechanism and a heating mechanism is unnecessary. The above advantages enable a fabrication apparatus cost to be reduced.

Page 11, lines 10-28 of the specification of the instant application disclose that alignment is performed first, and then the pressing and heating are performed for each chip in the first fixing. Thus, a “less expensive apparatus may be individually applied for an alignment mechanism and a heating mechanism.” In the second fixing, alignment need not be performed again, and a single machine in a single process may perform both pressing and heating.

Thus, the individual pressing of the chips one after another in the first fixing and the simultaneous pressing of the chips in the second fixing is not taught, mentioned or suggested in any of the cited references or combinations thereof, and would not be obvious to one of ordinary skill in the art.

Accordingly, claim 15 has been amended to clarify these distinctions, while claim 3 has been canceled.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claims 3, 5, 6, 8 and 15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over APA, Maeda, Koga and Sakata (previously applied).

Applicants respectfully traverse this rejection.

As Applicants argued in the Appeal Brief filed July 24, 1997, Applicants submit that no experimental results showing any advantages or unexpected results tending to establish the criticality of the claimed range need be submitted because the claimed feature is logically clear without the necessity of experimental results. This is because, as described previously and also described in the originally filed specification, if the first pressure were greater than the second pressure applied to the semiconductor chips, the bumps would be deformed to such a great extent that no further substantial deformation could be achieved by the relatively small second pressure, and, thus, final alignment of the heights thereof could not be achieved.

On the other hand, according to the present invention, when the second pressure is greater than the first pressure, it is possible to finally align the heights of the semiconductor bumps as it is possible to substantially further deform the semiconductor bumps with the second pressure after the same bumps are deformed by the relatively small first pressure. This is because, even after the bumps are deformed by the first pressure, the same bumps can be substantially further deformed by a second pressure which is greater than the first pressure.

Sakata discloses that each of the first pressure and a second pressure is approximately 20 kg. It is therefore clear that Sakata teaches that the first and second pressures are substantially *the same*. Accordingly, it is respectfully submitted that Sakata fails to teach that the second pressure is greater than the first pressure, as claimed in the present invention.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as unpatentable over APA, Maeda, Koga and DiStefano (previously applied).

Applicants respectfully traverse this rejection.

As argued in Applicants' Appeal Brief, DiStefano has been cited for teaching a heating step performed by a heat plate 58 on which a substrate is placed.

DiStefano is not combinable with Maeda to teach the present invention because, while DiStefano discloses conductive heating, which requires pressure, Maeda specifically discloses radiative heating without pressure.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claim 16 stands rejected under 35 U.S.C. § 103(a) as unpatentable over APA, Maeda, Koga, Sakata and DiStefano.

Applicants respectfully traverse this rejection.

As argued in Applicants' Appeal Brief, DiStefano has been cited for teaching a heating step performed by a heat plate 58 on which a substrate is placed.

DiStefano is not combinable with Maeda to teach the present invention because, while DiStefano discloses conductive heating, which requires pressure, Maeda specifically discloses radiative heating without pressure. As noted above, Sakata fails to teach the pressure comparison recited in claim 15, from which claim 16 depends.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as unpatentable over APA, Maeda, Koga and Fujimoto et al. (previously applied).

Applicants respectfully traverse this rejection.

As argued in Applicants' Appeal Brief, DiStefano has been cited for teaching a heating step performed by a heat plate 58 on which a substrate is placed.

DiStefano is not combinable with Maeda to teach the present invention because, while DiStefano discloses conductive heating, which requires pressure, Maeda specifically discloses radiative heating without pressure. As noted above, Sakata fails to teach the pressure comparison recited in claim 15, from which claim 16 depends.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as unpatentable over APA, Maeda, Koga, Sakata and Fujimoto et al.

Applicants respectfully traverse this rejection.

As argued in Applicnats' Appeal Brief, Fujimoto et al. has been cited for teaching a single bonding head 52 for each chip "without the need for using heat or supersonic waves" (see Abstract of Fujimoto et al."), which teaches away from the two heating steps recited in claim 15, from which claim 17 depends.

DiStefano and Fujimoto et al. both fail to teach, mention, or suggest the two-step heating with pressure applied to the semiconductor chips as recited in claim 15 and none of the cited references teaches, mentions, or suggests the relationship between the pressure applied in

U.S. Patent Application Serial No. 08/897,953
Response to Office Action dated January 13, 2006

the two heating steps, as recited in claim 15.

Sakata fails to teach the pressure comparison recited in claim 15, from which claim 17 depends.

Thus, the 35 U.S.C. § 103(a) rejection should be withdrawn.

In view of the aforementioned amendments and accompanying remarks, claims 5-6, 8 and 15-17, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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